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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No. 09/468,053	Applicant(s) OGATA ET AL.	
	Examiner Kelly L. Jerabek	Art Unit 2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9,11,19-27,29,37-45,47,55-63,65 and 73* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9, 11, 19-27, 29, 37-45, 47, 55-63, 65 and 73* is/are rejected.

7)☒ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 11/15/2004 have been fully considered but they are not persuasive.

Response to Remarks:

Applicant states (Amendment, page 20) that the Matsumoto reference does not meet the limitation "subtracting a positive valued compensation amount from each image". The Examiner respectfully disagrees. Figure 3B disclosed by Matsumoto shows the curves of two different weight functions (f,g) that are output to a first and second multiplier (27,28). The first multiplier (27) multiplies a pixel of field (A) by a cosine squared function and the second multiplier (28) multiplies a pixel of field (B) by a sine squared function (col. 9, lines 32-39). Each of these functions includes a correction coefficient (p) that serves to vary the weight functions (f,g) according to the brightness level of the different digital signals according to fields (A,B) (col. 7, lines 58-64). Also, the correction coefficient (p) ensures that the sum of the weight functions (f,g) will never exceed 1. According to figure 5, when a brightness level is higher than 0 and lower than ys1, the weight (f) for field (A) is larger and the weight (g) for field (B) is smaller (col. 10, lines 4-11). Similarly, when a brightness level is higher than ys1 the weight (f)

for field (A) is lower and the weight (g) for field (B) is higher (col. 10, lines 12-16). It can be seen that when the weight functions (f,g) are applied to the digital signals (x1,x2) they will serve to decrease the pixel level as long as either (f) or (g) is not 1 (figure 5). **Therefore, since the weight functions are less than 1 the weighted (compensated) image signal (x1 * $\cos^2(px)$ for field (A); x2 * $\sin^2(px)$ for field (B)) will be less than the original image signals (x1,x2). Thus, the weighting functions (f,g) are applied to the image signals of each field (A,B) a positive value compensation amount is subtracted from the pixel level of each of the plurality of images (x1,x2) to produce a compensated image (x1 * $\cos^2(px)$ for field (A); x2 * $\sin^2(px)$ for field (B)).**

Applicant states (Amendment, page 20) that the Matsumoto reference uses two linked weights for the two images rather than distinct coefficients for each image as in the present invention. This argument is moot since the claims do not exclude linked weights as coefficients.

Claim Objections

Claims 2, 20, 38, and 56 objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The limitation of

"... subtracting from the pixel level of each of the plurality of images a positive value given based on the exposure condition under which each of the images has been sensed to produce the compensated image" does not further limit the amended independent claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2, 9-11, 19-20, 27-29, 37-38, 45-47, 55-56, 63-65, and 73 rejected under 35 U.S.C. 102(e) as being anticipated by Matsumoto et al. US 6,677,992.

Re claim 1, Matsumoto discloses in figure 1 an imaging apparatus (1) including a CCD (2) capable of imaging an object at a shutter speed that is different from field to field (col. 8, lines 9-15). Therefore, an object is sensed under different exposure conditions in order to acquire a plurality of images. Based on a field judgement signal, a digital signal produced at a first shutter speed to render a field (A) is output from a first

selector (22) and a digital signal produced at a second shutter speed to render a field (B) is output from a second selector (23) (col. 8, lines 63-67). A first multiplier (27) and a second multiplier (28) multiply the digital image signals of fields (A) and (B) according to functions stored in LUTS (25,26) (col. 9, line 1 – col. 10, line 30). Figure 3B disclosed by Matsumoto shows the curves of two different weight functions (f,g) that are output to a first and second multiplier (27,28). The first multiplier (27) multiplies a pixel of field (A) by a cosine squared function and the second multiplier (28) multiplies a pixel of field (B) by a sine squared function (col. 9, lines 32-39). Each of these functions includes a correction coefficient (p) that serves to vary the weight functions (f,g) according to the brightness level of the different digital signals according to fields (A,B) (col. 7, lines 58-64). Also, the correction coefficient (p) ensures that the sum of the weight functions (f,g) will never exceed 1. According to figure 5, when a brightness level is higher than 0 and lower than ys1, the weight (f) for field (A) is larger and the weight (g) for field (B) is smaller (col. 10, lines 4-11). Similarly, when a brightness level is higher than ys1 the weight (f) for field (A) is lower and the weight (g) for field (B) is higher (col. 10, lines 12-16). It can be seen that when the weight functions (f,g) are applied to the digital signals (x1,x2) they will serve to decrease the pixel level as long as either (f) or (g) is not 1 (figure 5). **Therefore, since the weight functions are less than 1 the weighted (compensated) image signal (x1 * $\cos^2$(px) for field (A); x2 * $\sin^2$(px) for field (B)) will be less than the original image signals (x1,x2). Thus, the weighting functions (f,g) are applied to the image signals of each field (A,B) a positive value compensation amount is subtracted from the pixel level of each of the plurality of**

images (x1,x2) to produce a compensated image (x1 * $\cos^2$(px) for field (A); x2 * $\sin^2$(px) for field (B)). The compensated images are then synthesized in order to produce a single synthetic image having a wide dynamic range (col. 10, lines 30-42). When the sum of coefficients (f,g) exceeds 1 a compression circuit is installed to produce a compressed image (col. 10, lines 33-42). Therefore, depending on the performance of the output destination the synthetic image is compressed to produce a compressed image.

Re claim 2, see claim 1.

Re claim 9, each of the images disclosed by Matsumoto includes brightness signals (y,ys1,etc.) and color signals (R,G,B) (col. 8, lines 44 – col. 9, line 27; co. 11, lines 55-65). The brightness signals and color signals are separated and the brightness and color signals are compensated according to claims 1 and 2 above (col. 11, lines 55-65). The steps according to claims 1 and 2 are performed for the red, blue, and green dynamic range expanding circuits (15R, 15B, 15G) (col. 9, lines 52-55). Therefore, the compensated brightness and color signals are synthesized and compressed according to the same procedures as described in claims 1 and 2 above.

Re claim 11, a synthetic picture signal including both brightness and color signals using the techniques disclosed in claims 1 and 2 (col. 10, lines 23-32). If the level of the synthetic picture signal exceeds the saturation value, a compression circuit is installed

(col. 10, lines 33-42). Therefore, the synthetic picture signal is a mixed signal including compressed brightness and color signals.

Re claims 19-20, 37-38, and 55-56, see claim 1.

Re claims 27, 45, and 63, see claim 9.

Re claims 29, 47, and 65, see claim 11.

Re claim 73, Matsumoto discloses in figure 1 an imaging apparatus (1) including a CCD (2) capable of imaging an object at a shutter speed that is different from field to field (col. 8, lines 9-15). Therefore, an object is sensed under different exposure conditions in order to acquire a plurality of images. Plural images are synthesized in order to produce a single synthetic image having a wide dynamic range (col. 10, lines 30-42). When the sum of coefficients (f,g) exceeds 1 a compression circuit is installed to produce a compressed image (col. 10, lines 33-42). Therefore, depending on the performance of the output destination the synthetic image is compressed to produce a compressed image. Based on a field judgement signal, a digital signal produced at a first shutter speed to render a field (A) is output from a first selector (22) and a digital signal produced at a second shutter speed to render a field (B) is output from a second selector (23) (col. 8, lines 63-67). A first multiplier (27) and a second multiplier (28) multiply the digital image signals of fields (A) and (B) according to functions stored in

LUTS (25,26) (col. 9, line 1 – col. 10, line 30). Figure 3B disclosed by Matsumoto shows the curves of two different weight functions (f,g) that are output to a first and second multiplier (27,28). The first multiplier (27) multiplies a pixel of field (A) by a cosine squared function and the second multiplier (28) multiplies a pixel of field (B) by a sine squared function (col. 9, lines 32-39). Each of these functions includes a correction coefficient (p) that serves to vary the weight functions (f,g) according to the brightness level of the different digital signals according to fields (A,B) (col. 7, lines 58-64). Also, the correction coefficient (p) ensures that the sum of the weight functions (f,g) will never exceed 1. According to figure 5, when a brightness level is higher than 0 and lower than ys1, the weight (f) for field (A) is larger and the weight (g) for field (B) is smaller (col. 10, lines 4-11). Similarly, when a brightness level is higher than ys1 the weight (f) for field (A) is lower and the weight (g) for field (B) is higher (col. 10, lines 12-16). It can be seen that when the weight functions (f,g) are applied to the digital signals (x1,x2) they will serve to decrease the pixel level as long as either (f) or (g) is not 1 (figure 5). **Therefore, since the weight functions are less than 1 the weighted (compensated) image signal (x1 * $\cos^2$(px) for field (A); x2 * $\sin^2$(px) for field (B)) will be less than the original image signals (x1,x2). Thus, the weighting functions (f,g) are applied to the image signals of each field (A,B) a positive value compensation amount is subtracted from the pixel level of each of the plurality of images (x1,x2) to produce a compensated image (x1 * $\cos^2$(px) for field (A); x2 * $\sin^2$(px) for field (B)).**

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3-5, 21-23, 39-41, and 57-59 rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto in view of Fukuda et al. US 6,278,490.

Re claim 3, Matsumoto discloses all of the limitations of claim 2 above. In addition, Matsumoto states that image signals (x1a,x2a) corresponding to fields A and B respectively are multiplied by weight functions ($f=\cos^2(px)$ for field (A); $g=\sin^2(px)$ for field (B)) (col. 9, lines 24-50). A signal (x) of the weight functions (f,g) is multiplied by a correction coefficient (p) according to the brightness level and exposure time of an image signal (col. 7, lines 49-64). Therefore, a pixel value (x1a,x2a) is multiplied by a factor (f,g) that is set based on the exposure condition of an image signal in order to calculate a positive value ($x1a * \cos^2(px)$ for field (A); $x2a * \sin^2(px)$ for field (B). As shown in figure 5, image signals (x1a) and (x2a) always have a positive value and the sum of weight functions (f,g) must always be 1 (col. 10, lines 33-34). Thus, ($x1a * \cos^2(px)$ for field (A); $x2a * \sin^2(px)$ for field (B)) are always positive values that are less

than the original image signals (x1a and x2a). Although Matsumoto discloses all of the limitations above, he fails to distinctly state that a mean pixel value of each of the images is calculated.

Fukuda discloses in figure 8 an image pickup apparatus that includes a detection circuit (23) that detects variations in light emission amount from image data of two frames with different exposure amounts and a correction circuit (24) that corrects image data on the basis of a signal obtained by the detection circuit (23) (col. 12, lines 26-35). The detection circuit (23) calculates the average values of image data of signals having different exposure times (col. 12, lines 36-48). Therefore, it would have been obvious for one skilled in the art to have been motivated to include the detection circuit (23) capable of calculating the average values of image data of signals having different exposure times as disclosed by Fukuda in the imaging apparatus capable of multiplying image signals by weight functions (f,g) as disclosed by Matsumoto. Doing so would provide a means for calculating average values of image data for short and long exposure periods and using the calculated average values to manipulate the image data (Fukuda: col. 12, lines 36-48).

Re claim 4, the positive values (x1a * $\cos^2(px)$ for field (A); x2a * $\sin^2(px)$ for field (B)) disclosed by Matsumoto are time-smoothed because they include cosine and sine functions (see figures 3B and 5). As shown in figure 5, image signals (x1a) and (x2a) always have a positive value and the sum of weight functions (f,g) must always be 1 (col. 10, lines 33-34). Therefore, when the weight functions (f,g) are each equal to (0.5),

the positive values (x1a * $\cos^2(px)$ for field (A); x2a * $\sin^2(px)$ for field (B)) are each equal to one-half of the original image signals (x1a, x2a). Thus, it can be seen that when the weight functions (f,g) are each equal to (0.5), subracting the time smoothed positive values (x1a * $\cos^2(px)$ for field (A); x2a * $\sin^2(px)$ for field (B)) from the original image signals (x1a, x2a) yields the same result as multiplying the original image signals (x1a, x2a) by weight functions (f,g).

Re claim 5, A signal (x) of the weight functions (f,g) is multiplied by a correction coefficient (p) according to the brightness level and exposure time of an image signal (col. 7, lines 49-64). Therefore, a pixel value (x1a,x2a) is multiplied by a factor (f,g) that is set based on the exposure condition of an image signal in order to calculate a positive value (x1a * $\cos^2(px)$ for field (A); x2a * $\sin^2(px)$ for field (B). As shown in figure 5, image signals (x1a) and (x2a) always have a positive value and the sum of weight functions (f,g) must always be 1 (col. 10, lines 33-34). Fields (A) and (B) represent images with different exposure times (col. 8, lines 63-67). As shown in figure 5, depending on the brightness level the weight functions or factors (f,g) are varied. When a brightness level is higher than 0 and lower than ys1, the weigt (f) for field (A) is larger and the weight (g) for field (B) is smaller (col. 10, lines 1-11). Similarly, when a brightness level is higher than ys1, the weight (f) for field (A) is smaller and the weight (g) for field (B) is larger (col. 10, lines 12-22). Therefore, it can be seen that depending on the brightness level the factor (f or g) is set larger for the image (A or B) having been sensed with a larger exposure.

Re claims 21, 39, and 57, see claim 3.

Re claims 22, 40, and 58, see claim 4.

Re claims 23, 41, and 59, see claim 5.

Claims 6-8, 24-26, 42-44, and 60-62 rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto in view of Sanner US 4,757,386.

Re claim 6, Matsumoto discloses all of the limitations of claim 2 above. In addition, Matsumoto states that image signals (x1a,x2a) corresponding to fields A and B respectively are multiplied by weight functions ($f=\cos^2(px)$ for field (A); $g=\sin^2(px)$ for field (B)) (col. 9, lines 24-50). A signal (x) of the weight functions (f,g) is multiplied by a correction coefficient (p) according to the brightness level and exposure time of an image signal (col. 7, lines 49-64). Therefore, a pixel value (x1a,x2a) is multiplied by a factor (f,g) that is set based on the exposure condition of an image signal in order to calculate a positive value ($x1a * \cos^2(px)$ for field (A); $x2a * \sin^2(px)$ for field (B). As shown in figure 5, image signals (x1a) and (x2a) always have a positive value and the sum of weight functions (f,g) must always be 1 (col. 10, lines 33-34). Thus, ($x1a * \cos^2(px)$ for field (A); $x2a * \sin^2(px)$ for field (B)) are always positive values that are less than the original image signals (x1a and x2a). Although Matsumoto discloses all of the

limitations above, he fails to distinctly state that the signal each of the images is filtered by a low-pass filter.

Sanner discloses in figure 1 video processor including an image sensor (12) with two output channels (14,16). Low-pass filters (22,26) are included in order to contain the modulation frequencies of the two channels (14,16) (col. 2, line 65 – col. 3, line 9). The pixels from each of the output channels (14,16) that are filtered by the low-pass filters (22,26) are finally combined by a multiplexer (40) to combine the pixels from each of the channels (14,16) into a single output (col. 3, line 63 – col. 4, line 4). Therefore, it would have been obvious for one skilled in the art to have been motivated to include the low-pass filters (22,26) capable of containing the modulation frequencies of the two channels (14,16) as disclosed by Sanner in the imaging apparatus capable of multiplying image signals by weight functions (f,g) as disclosed by Matsumoto. Doing so would provide a means for filtering image signals of different channels in order to contain the modulation frequencies of the two channels (col. 2, line 65 – col. 3, line 9).

Re claim 7, the positive values ($x1a * \cos^2(px)$ for field (A); $x2a * \sin^2(px)$ for field (B)) disclosed by Matsumoto are time-smoothed because they include cosine and sine functions (see figures 3B and 5). As shown in figure 5, image signals (x1a) and (x2a) always have a positive value and the sum of weight functions (f,g) must always be 1 (col. 10, lines 33-34). Therefore, when the weight functions (f,g) are each equal to (0.5), the positive values ($x1a * \cos^2(px)$ for field (A); $x2a * \sin^2(px)$ for field (B)) are each equal to one-half of the original image signals (x1a, x2a). Thus, it can be seen that

when the weight functions (f,g) are each equal to (0.5), subracting the time smoothed positive values (x1a * $\cos^2(px)$ for field (A); x2a * $\sin^2(px)$ for field (B)) from the original image signals (x1a, x2a) yields the same result as multiplying the original image signals (x1a, x2a) by weight functions (f,g).

Re claim 8, A signal (x) of the weight functions (f,g) is multiplied by a correction coefficient (p) according to the brightness level and exposure time of an image signal (col. 7, lines 49-64). Therefore, a pixel value (x1a,x2a) is multiplied by a factor (f,g) that is set based on the exposure condition of an image signal in order to calculate a positive value (x1a * $\cos^2(px)$ for field (A); x2a * $\sin^2(px)$ for field (B). As shown in figure 5, image signals (x1a) and (x2a) always have a positive value and the sum of weight functions (f,g) must always be 1 (col. 10, lines 33-34). Fields (A) and (B) represent images with different exposure times (col. 8, lines 63-67). As shown in figure 5, depending on the brightness level the weight functions or factors (f,g) are varied. When a brightness level is higher than 0 and lower than ys1, the weigt (f) for field (A) is larger and the weight (g) for field (B) is smaller (col. 10, lines 1-11). Similarly, when a brightness level is higher than ys1, the weight (f) for field (A) is smaller and the weight (g) for field (B) is larger (col. 10, lines 12-22). Therefore, it can be seen that depending on the brightness level the factor (f or g) is set larger for the image (A or B) having been sensed with a larger exposure.

Re claims 24, 42, and 60, see claim 6.

Re claims 25, 43, and 61, see claim 7.

Re claims 26, 44, and 62, see claim 8.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contacts

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kelly L. Jerabek whose telephone number is **(571) 272-7312**. The examiner can normally be reached on Monday - Friday (8:00 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy Garber can be reached on **(571) 272-7308**. The fax phone number for submitting all Official communications is 703-872-9306. The fax phone number for submitting informal communications such as drafts, proposed amendments, etc., may be faxed directly to the Examiner at **(571) 273-7312**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KLJ

Wendy Garber

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